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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Paper No. 39

Application Number: 09/193,928  
Filing Date: November 17, 1998  
Appellant(s): ATSUMI ET AL.

Mr. Louis J. DelJuidice (Reg. No. 47,522)  
For Appellant

**EXAMINER'S ANSWER**

**MAILED**

**MAY 04 2004**

**GROUP 3700**

This is in response to the appeal brief filed 20 February 2004.

**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

The appellant's statement of the status of amendments after final rejection contained in the brief is incorrect. The appellant states that an amendment on April 22, 2003 has been entered. However the response of 22 April 2003 contained only an argument and no amendment to the claims. As such there have been no submitted amendments after the final office action mailed 22 January 2003.

**(5) *Summary of Invention***

The summary of invention contained in the brief is deficient because it states that the shaft is 30-50% lighter than conventional shafts. The examiner disclosed a

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conventional shaft having the claimed shaft weight (JP 9-140840). The examiner agrees with the statement that the weight of the shaft is from 30-40 grams.

**(6) *Issues***

The appellant's statement of the issues in the brief is correct.

**(7) *Grouping of Claims***

Appellant's brief includes a statement that claims 1 and 21 and 22 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

**(8) *Claims Appealed***

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(9) *Prior Art of Record***

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3,646,610	JACKSON	2-1972
4,157,181	CECKA	6-1979
4,682,504	KOBAYASHI	7-1987
5,720,671	CHENG	2-1998
6,106,413	KUSUMOTO	8-2000
6,126,557	PREECE	10-2000

Nakazato, Takaki "Golf Club Shaft and Its Production Method", JP 6-114131, 26 April 1994, [0024], Table 1, page 8.

Yoshida, Makoto "Golf Club Shaft", JP 9-140840, 3 June 1997, Claim.

**(10) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC ' 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. Claim 1 stands rejected and claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng in view of Kobayashi (4,682,504), JP 6-114131, and JP 9-140840.

Cheng discloses an inner layer being a first angled layer in form of bonding a first layer (Ref. No. 22b) and a second layer (Ref. No. 22c), a first angled layer being concentric with a longitudinal axis of a shaft and circular in cross section in the form of the body having successive layers placed around a mandrel (Col. 3, Lns. 1-12) and the shape formed having a diameter (Col. 2, Lns. 41-59), a first straight layer formed on a first angled layer (Fig. 2, Ref. No. 22a), a first straight layer being concentric with a longitudinal axis of a shaft and circular in cross section in the form of the body having successive layers placed around a mandrel (Col. 3, Lns. 1-12) and the shape formed having a diameter (Col. 2, Lns. 41-59), a second angled layer formed on a first straight layer, a second straight layer formed on a second angled in the form of there being 10-20 layers and fibers of each successive layer are 22a, 22b and 22c and as such there will be at least three sequences of the order of 22a, 22b and 22c and a second angled layer will be formed by bonding a first layer (Ref. No. 22b) and a second layer (Ref. No. 22c) (Col. 2, Lns. 64 through Col. 3, Lns. 12), a second angled layer and a second straight layer being concentric with a longitudinal axis of a shaft and circular in cross section in the form of the body having successive layers placed around a mandrel (Col. 3, Lns. 1-12) and the shape formed having a diameter (Col. 2, Lns. 41-59), and a shaft having 4 to 8 layers in the form of there being preferably 10-20 layers and fibers of each successive layer being 22a, 22b and 22c and as such there will be at least three

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sequences of the order of 22a, 22b and 22c and a first angled layer and a second angled layer will be formed by bonding a first layer (Ref. No. 22b) and a second layer (Ref. No. 22c). As such there will be about 7 layers.

Cheng lacks each layer extending over a length of a shaft, a second angled layer having an angle orientation and thickness effective to provide a shaft with a torsional strength of at least 120 kgf x m x degrees, and a weight of from 30-40 grams.

Kobayashi discloses a strong golfer needing a shaft with high stiffness for longitudinal bending and torsional bending (Col. 1, Lns. 13-25). JP 6-114131 discloses each layer extends over a length of a shaft (Figure 2), and a shaft having a twisting strength of 230 kgf cm (0024, Table 1). As shown in JP 6-114131, an artisan skilled in the art of manufacturing a torsional resistant and strong shaft would have selected a suitable torsional strength for a shaft in which a torsional strength of at least 120 kgf x m x degrees is included. In view of the patents of Kobayashi and JP 6-114131 it would have been obvious to modify the shaft of Cheng to have a shaft with sufficient layers of fibers oriented at an angle with respect to longitudinal axis of a shaft and thicknesses of layers such that there would be a torsional strength of at least 120 kgf x m x degrees in order to minimize errors when swinging a shaft due to the shaft having excessive twisting during the swing of a strong player causing errors at impact. In view of the patent of JP 6-114131 it would have been obvious modify the shaft of Cheng to have each layer extending over the length of a shaft in order to provide strength and stiffness along the entire length of a shaft.

JP 9-140840 discloses layers being arranged substantially concentrically about a central portion of a golf club shaft (Figs. 1 and 4-6), and a shaft weight of 10-50 grams (Claim) in order to have a shaft with good bending strength and twisting strength which is light weight (0002-0003). In view of the patent of JP 9-140840 it would have been obvious to modify the shaft of Cheng to have a shaft with a weight of 30-40 grams in order to have a light weight shaft which minimizes fatigue felt by a player while playing a round of golf. In addition, it would have been obvious to modify the shaft of Cheng to have the layers arranged substantially concentrically about a central portion of a shaft in order to have more consistent performance about the circumference of a shaft.

3. Claim 21 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson (3,646,610) in view of JP 6-114131, Kusumoto, JP 9-140840, Preece and Cecka.

Jackson discloses a first angled layer (43'), a first straight layer (47') formed on a first angled layer, a second angled layer (50') formed on a first straight layer, a second straight layer (54') formed on second angled layer (Fig. 15), each layer extending over the length of the shaft (Fig. 15), fibers (Col. 2, Lns. 46-56), angled layers having fibers in opposite directions (Fig. 15), fibers of a second angled layer oriented at an angle in a range from 35-75 degrees (Fig. 15), and another embodiment of a tapered shaft having a location near a tip end having a wall thickness substantially twice the thickness of a location near a butt end (Figs. 4-5).

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Jackson lacks a first angled layer and a second angled layer each being formed by bonding a first layer and a second layer, a first layer having fibers oriented at a first angle and a second layer having fibers oriented at a second opposite angle, layers effective to provide a shaft with a torsional strength of at least 120 kgf x m x degrees, a weight of from 30-40 grams, a second angled layer having a thickness in a range of from .04 to .1mm, and a first angled layer having a thickness near the small diameter end of a shaft twice that of the thickness of the layer near the large diameter end of a shaft.

JP 6-114131 discloses each layer extends over a length of a shaft (Figure 2), and a shaft having a twisting strength of 230 kgf cm (0024, Table 1). As shown in JP 6-114131, an artisan skilled in the art of manufacturing a torsional resistant and strong shaft would have selected a suitable torsional strength in which a torsional strength of at least 120 kgf x m x degrees is included. In view of the patent of JP 6-114131 it would have been obvious to modify the shaft of Jackson to have a shaft with sufficient layers of fibers oriented at an angle with respect to longitudinal axis of a shaft and thicknesses such that there would be a torsional strength of at least 120 kgf x m x degrees in order to minimize errors when swinging a shaft due to the shaft having excessive twisting during the swing of a strong player causing errors at impact. In view of the patent of JP 6-114131 it would have been obvious modify the shaft of Jackson to have each layer extending over the entire length of a shaft in order to provide strength and stiffness along the entire length of a shaft.



Kusumoto discloses a shaft made with fibers in the form of prepreg sheets (abstract) having a thickness not larger than .06 mm (Col. 12 Lns. 12-27). In view of the patent of Kusumoto it would have been obvious to modify the shaft of Jackson to be made of fibers in prepreg sheets in order to simplify the manufacturing process by not have to have a winding machine wrapping fibers around a mandrel. In view of the patent of Kusumoto it would have been obvious to modify the shaft of Jackson to have a shaft formed of to have a second angled layer having a thickness in a range of from .04 to .1 mm in order to provide a shaft with a sufficient amount of stiffness in the longitudinal and torsional directions.

JP 9-140840 discloses a shaft weight of 10-50 grams (Claim) in order to have a shaft with good bending strength and twisting strength which is light weight (0002-0003). In view of the patent of JP 9-140840 it would have been obvious to modify the shaft of Jackson to have a shaft with a weight of 30-40 grams in order to have a light weight shaft which minimizes fatigue felt by a player while playing a round of golf.

Preece discloses an angled layer formed by bonding a first angled layer with second angled layer (Fig. 1B). In view of the patent of Preece it would have been obvious to modify the shaft of Jackson to have an angled layer formed by bonding a first angled layer with second angled layer in order to simplify the manufacturing process of producing angled layers with opposite angle orientations.

Cecka discloses a tapered shaft having a tip end wall thickness substantially twice the thickness of a butt end wall thickness (Figs. 8-9). In view of the patent of Cecka it would have been obvious to modify the shaft of Jackson to have each layer

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twice the thickness at the tip end compared to the butt end in order to have a strong tip end to prevent the tip end from fracturing.

### ***Response to Arguments***

4. The argument that it is improper to use the reference of JP '131 to combine with the reference of Cheng since JP '131 would result in a 0 degree layer between a + theta and - theta layers is disagreed with. JP '131 was not used to show layer configuration but to show the teaching that it is known to extend layers over a length of a shaft. Cheng is quiet to the length of the layers which make up the base rod and it is most likely that the layers extend over the length of the shaft for the base rod since Cheng would most likely disclose if it didn't. JP '131 was used to show this teaching which is well known in the art. JP '131 was also used to show that twisting strength is a concern for golf club shafts and JP '131 disclosed a suitable value. The argument Cheng does not disclose 4 to 8 layers is disagreed with. Cheng discloses typically 10-20 layer as shown in figure 2 (Col. 2, Lns. 64-67). Clearly this discloses that other variations can be used in terms of layers. None-the-less the applicant's angled layer is formed by bonding two opposing angled layers together. Clearly in Cheng the layers of reference number 22c and 22b are bonded together due to being next to each other and can represent the angled layer of figures 4c and 4e. As such a 10 layered embodiment of Cheng would represent a 7 layer shaft as defined by the applicants layers. The argument that it is improper to combine the reference of Kusumoto with the reference of

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Jackson since Kusumoto discloses an intermediate layer with fibers perpendicular to a longitudinal axis and does not disclose a second angled layer is disagreed with.

Kusumoto was not used to show these features but Jackson was. Kusumoto was used only to show that it is known to form a shaft with fibers in a prepreg sheet having a thickness of .06 mm. The argument that it is improper to combine the references of Jackson and Preece since Jackson discloses fibers twisted together and not bonded together and Preece does not disclose strands is disagreed with. The fibers of Jackson are bonded together using a binder (Col. 2, Lns. 21-25). Preece discloses another suitable way to bond fibers together using prepreg plies.

**(11) *Response to Argument***

In the arguments filed 20 February June 2004, the appellant argues:

1. It is improper to use the reference of Kobayashi with Cheng since Kobayashi does not provide motivation to one of ordinary skill in the art to combine Cheng with JP '131 to provide Cheng's golf club shaft with increased torsional strength since Kobayashi is silent about what is required to increase torsional strength of a shaft.
2. It is improper to use the reference of Cheng since Cheng does not disclose which layer should be the inner layer.

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3. It is improper to use the reference of Cheng since if the example in column 3, lines 9-12 is followed one of ordinary skill in the art would use 5 angled layers and 5 parallel layers since Cheng does not disclose repeating the pattern set forth in figure 2.
4. It is improper to use the reference of Cheng since none of Cheng's layering suggestions match the layers disclosed by JP '131 and JP '840.
5. It is improper to use the reference of Cheng since it would require undue experimentation for one ordinary in the art to arrive at the layers of the claimed invention since with 4 positions 20 layers there are about 160,000 different variations of layers.
6. It is improper to use the reference of Cheng since references teach a specific order of the layers may also be important and one of ordinary skill in the art is not motivated to act contrary to that teaching.
7. It is improper to use the reference of Cheng since Cheng does not sell a shaft lighter than 50 grams.
8. It is improper to combine the references of Cheng with JP '131 since JP '131 discloses a different layer pattern and JP '131 does not disclose the claimed weight.

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9. It is improper to combine the references of Cheng with JP '840 since JP '840 discloses a different layer pattern.

10. It is improper to combine the references of Cheng with JP '131 and JP '840 since in doing so the examiner is improperly selecting disparate parts from two references to "piece together" the presently claimed invention using hindsight.

11. It is improper to use the reference of Jackson (figure 15) since the claims recite a first angled layer and Jackson's layer 40' is parallel to the longitudinal axis of the shaft. The examiner cannot ignore layer 40'.

12. It is improper to use the combine the references of Jackson and JP '131 since JP '131 has different layers than Jackson.

13. It is improper to use the combine the references of Jackson and JP '131 since extending the layers would increase the weight of the shaft.

14. It is improper to use the reference of Jackson since the shaft of Jackson weighs 140 grams.

15. It is improper to combine the references of Jackson and Kusumoto since Kusumoto has different layers than Jackson. The examiner is choosing one layer when the entire structure of Kusumoto is different.

16. It is improper to combine the references of Jackson with JP '131 and JP '840 since in doing so the examiner is improperly selecting disparate parts from two references to "piece together" the presently claimed invention using hindsight.

17. It is improper to combine the references of Jackson with Preece and Cecka since the layer pattern is different. Cecka does not disclose straight or parallel layers.

18. It is improper to combine the reference of Jackson with the other cited references since Jackson is composed of fiberglass and the other references are formed of fiber-reinforced polymer composites. Jackson contains chopped fibers and the method of manufacturing the shaft of Jackson is different. The chopped fibers provide different connecting strength, resistance to force, and other wear resistant properties unlike those available in fiber-reinforced polymers (FRP).

19. With respect to item 1, the argument that it is improper to use the reference of Kobayashi with Cheng since Kobayashi does not provide motivation to one of ordinary skill in the art to combine Cheng with JP '131 to provide Cheng's golf club

shaft with increased torsional strength since Kobayashi is silent about what is required to increase torsional strength of a shaft is disagreed with. Kobayashi discloses why shafts with different torsional and bending stiffnesses are needed which is to support the different strengths of different golfers. Clearly one skilled in the art would apply that teaching with other knowledge known in the art for each type design including the design of Cheng. There are variables available to one skilled in the art as types of prepreg, number of layers, thickness, and diameters which would determine the torsional breaking load of the shaft of Cheng where the teaching of Kobayashi would be utilized. JP '313 showed a suitable torsional breaking load value as is the claimed value.

20. With respect to item 2, the argument that it is improper to use the reference of Cheng since Cheng does not disclose which layer should be the inner layer is disagreed with. Figure 2 shows which layers is above the other layer and than shows the same order when making the hosel and flared sections (Fig. 3). The concavity of each of the layers also shows what orientation the fibers would be to the longitudinal axis of the shaft (Fig. 2).

21. With respect to item 3, the argument that it is improper to use the reference of Cheng since if the example in column 3, lines 9-12 is followed one of ordinary skill in the art would use 5 angled layers and 5 parallel layers since Cheng does not disclose repeating the pattern set forth in figure 2 is disagreed with. Cheng

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clearly states that the base rod is formed of typically 10-20 layers with each successive base rod layer being 22a, 22b, and 22c so to have different angles for each layer (Col. 2, Lns. 64 through Col. 3, Lns. 3). Cheng does go on to disclose modification to this pattern by saying "It should be noted, however, that the fibers of successive base rod layers, such as the outer layers, may be parallel to one another." This appears to the examiner as an alternative layer pattern than having each successive base rod layer having different angles (Col. 3, Lns. 1-2).

22. With respect to item 4, the argument that it is improper to use the reference of Cheng since none of Cheng's layering suggestions match the layers disclosed by JP '131 and JP '840 is disagreed with. The Cheng is quiet to the weight and torsional strength for a shaft but clearly has a weight and a torsional strength. JP '131 was used to not show a type of pattern for layers but that torsional breaking load is of concern and JP '131 was also used to show a suitable value for torsional breaking load. JP '840 was used to not show a type of a pattern for layers but that weight is of concern and the claimed weight is used in the art. Cheng was used to show the pattern for the layers.

23. With respect to item 5, the argument that it is improper to use the reference of Cheng since it would require undue experimentation for one ordinary in the art to arrive at the layers of the claimed invention since with 4 positions 20 layers there



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are about 160,000 different variations of layers is disagreed with. The examiner believes that Cheng discloses the pattern of layers as claimed. See item 21 above.

24. With respect to item 6, the argument that it is improper to use the reference of Cheng since references teach a specific order of the layers may also be important and one of ordinary skill in the art is not motivated to act contrary to that teaching is disagreed with. The examiner believes that Cheng discloses the pattern of layers as claimed. See item 21 above.

25. With respect to item 7, the argument that it is improper to use the reference of Cheng since Cheng does not sell a shaft lighter than 50 grams is disagreed with. JP '840 clearly discloses that it is desirable to have shaft even lighter as 10-50 grams. One skilled in the art would use obvious techniques to achieve the desired weight. Cheng discloses that typically 10-20 layers are used for a shaft. This seems to leave room for one skilled in the art to have a smaller or greater number of layers to adjust with.

26. With respect to item 8, the argument that it is improper to use the reference of Cheng with JP '131 since JP '131 discloses a different layer pattern and JP '131 does not disclose the claimed weight is disagreed with. JP '131 was not used to show the claimed pattern for layers or the claimed weight. Cheng was used to show the claimed pattern for layers. JP '840 was used to show that it was desirable to have the

claimed weight. JP '131 was used to show that torsional breaking load is of concern and disclosed a suitable value of which the claimed value is a suitable selection.

27. With respect to item 9, the argument that it is improper to combine the references of Cheng with JP '840 since JP '840 discloses a different layer pattern is disagreed with. JP '840 was not used to show the pattern layer but Cheng was. JP '840 was used to show the teaching of shaft weight used in the art.

28. With respect to item 10, the argument that it is improper to combine the references of Cheng with JP '131 and JP '840 since in doing so the examiner is improperly selecting disparate parts from two references to "piece together" the presently claimed invention using hindsight is disagreed with. The shaft of Cheng will have a shaft weight and will have a torsional breaking load. The torsional break load as defined by the claims are obvious taking into account the teaching of JP '131 and Kobayashi. And the shaft weight as defined by the claims are obvious taking into account the teaching of JP '840.

29. With respect to item 11, the argument that it is improper to use the reference of Jackson (figure 15) since the claims recite a first angled layer and Jackson's layer 40' is parallel to the longitudinal axis of the shaft is disagreed with. The claims do not require the inner layer to be the innermost layer. The examiner used layer 43' as the inner layer being a first angled layer (Fig. 15). Clearly layer 43' is an

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inner layer to layers 47', 50' and 54'. The examiner did not remove or ignore layer 40'.

The claims did not require the first layer to be the innermost layer.

30. With respect to item 12, the argument that it is improper to combine the references of Jackson and JP '131 since JP '131 has different layers than Jackson is disagreed with. JP '131 was not used to show the pattern of layers but Jackson was. JP '131 was used to show that torsional breaking load is of concern and disclosed a suitable value of which the claimed value is a suitable selection

31. With respect to item 13, the argument that it is improper to combine the references of Jackson and JP '131 since extending the layers would increase the weight of the shaft is disagreed with. Jackson was quiet to the length of each of the fiber layers for the length of the shaft. However since Jackson does not disclose that any layer would be less than the length of the shaft so one skilled in the art would assume each layer is the length of the shaft. Never-the-less the examiner used JP '131 to show that it is will know to form shafts with every layer being along the entire length of the shaft (Fig. 2) unlike the teaching of Cheng where there are added layers only at the tip of the shaft.

32. With respect to item 14, the argument that it is improper to use the reference of Jackson since the shaft of Jackson weighs 140 grams is disagreed with. Jackson was made early in the process of making composite shafts. With today's

technology it would be obvious to make shafts significantly lighter and yet still be strong for the same pattern for layers.

33. With respect to item 15, the argument that it is improper to combine the references of Jackson and Kusumoto since Kusumoto has different layers than Jackson is disagreed with. Jackson is quiet with respect to the thickness of layers but clearly has thicknesses for each layer. Kusumoto discloses forming shafts from prepreg sheets as opposed to filament winding and Kusumoto discloses thicknesses for prepreg sheets used in forming shafts. The end product of forming a shaft using prepreg sheets or winding fiber directly to a mandrel using a binder has the same end result. These methods are suitable alternatives for each other used in the art of forming golf club shafts. With the teaching of Kusumoto having prepreg sheet not larger than .06 mm, .04mm and .02 mm (Col. 12, Lns. 11-27), an angled layer having the claimed thickness is an obvious selection for a shaft formed using prepreg sheets.

34. With respect to item 16, the argument that it is improper to combine the references of Jackson with JP '131 and JP '840 since in doing so the examiner is improperly selecting disparate parts from two references to "piece together" the presently claimed invention using hindsight. The shaft of Jackson will have a shaft weight and will have a torsional breaking load. The torsional break load as defined by the claims are obvious taking into account the teaching of JP '131 and Kobayashi. And

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the shaft weight as defined by the claims are obvious taking into account the teaching of JP '840.

35. With respect to item 17, the argument that it is improper to combine the references of Jackson with Preece and Cecka since the layer pattern is different is disagreed with. Preece was used to show another common way to form angled layers with both positive and negative fibers using a prepreg sheet method instead of winding fiber method in forming layers as 43' and 50' except without chopped fibers. The patent of Jackson itself shows different embodiments without chopped fiber (Fig. 14). Clearly it would be obvious to one skilled in the art to form a shaft using prepreg sheets having the pattern as figure 15 of Jackson except without chopped fibers since Jackson shows embodiments with and without chopped fiber (Figs. 13-14) and forming shafts using prepreg sheets is an alternative manufacturing method to filament winding. Jackson also discloses wall thickness of a shaft increasing from a butt to a tip end (Figs. 4-5). Cecka discloses this a tip end wall thickness being twice the thickness of a butt end wall thickness. Clearly for this to be done using the prepreg sheet method with all layers being along the entire length of the shaft, each sheet would have to wrap twice as many times near the tip than at the butt end. Cecka was not used to show pattern of layers but that it is know to increase shaft wall thickness from a butt end to a tip end also as shown by Jackson.

36. With respect to item 18, the argument that it is improper to combine the reference of Jackson with the other cited references since Jackson is composed of fiberglass and the other references are formed of fiber-reinforced polymer composites is disagreed with. Jackson contains chopped fibers and the method of manufacturing the shaft of Jackson is different. The chopped fibers provide different connecting strength, resistance to force, and other wear resistant properties unlike those available in fiber-reinforced polymers (FRP). See item 35 above. Methods of fiber winding and prepreg sheet winding are interchanged throughout the art in forming golf club shafts. With in reason, they are suitable alternatives for forming shafts.

37. The applicant's pattern of layers as well as applicant's shaft weight have been around the art a long time. The torsional strength is a suitable selection. It is believed no new inventive concepts are being disclosed.

For the above reasons, it is believed that the rejections should be sustained.

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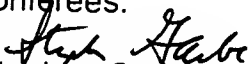
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May 3, 2004

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